ARTICLE 34(1-23)

CLAIMS (amended)

1. A method for producing a porous carbon article comprising the steps of formation of one or more carbide powders into an intermediate body with transport pores, i.e. pores having a size larger than 100 nm, by shaping, **characterised** by the further steps of, selecting the one or more carbide powdes on the basis of dependence of specified nanopore size on physical and chemical constants of the carbides using the relationship;

$$X = Z^*(1-R)/R$$

where X = specified size of nanopores, nm;

Z = 0.65-0.75 nm;

$R = \nu M_c \rho_k / M_k \rho_c$

where M_c - molecular mass of carbon, g/mole;

M_k - molecular mass of carbide, g/mole;

ρ_k - density of carbide, g/ccm;

ρ_c - density of carbon, g/ccm;

ν - number of carbon atoms in carbide molecule,

heat treating the intermediate body in a medium of gaseous hydrocarbon or hydrocarbon mixtures at a temperature exceeding the decomposition temperature for the hydrocarbon or hydrocarbons until the mass of the intermediate body has increased at least 3% thereby creating a workpiece in the form of a rigid carbonaceous skeleton,

thereafter thermochemically treating the work piece in a medium of gaseous halogens to provide predetermined nanopore sizes, i.e the pores have a size less than 10 nm, a predetermined volume of nanopores, and a predetermined distribution of nanopores within the volume of the article, the carbides used forming carbons having a slot-like structure

2. A method according to Claim 1, **characterised** in that elements from III, IV, V or VI group of Mendeleyv's Periodic system are selected as carbon precursor.

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3. A method according to Claims 1 ~~or 2~~, **characterised** in that the formulation of carbide particle mixture is chosen in dependence of desired distribution of nanopores by sizes using the relationship;

$$\Psi_i = K_i\varphi_i / \sum K_i\varphi_i$$

where Ψ_i - volumetric part of nanopores with size x_i in total volume of nanopores;

φ_i - volumetric part of i-th carbide in particle mixture;

n - number of carbides;

$$K_i = 1 - \nu M_c\rho_{ki} / M_{ki}\rho_c$$

where M_c - molecular mass of carbon, g/mole;

M_{ki} - molecular mass of it-h carbide, g/mole;

ρ_{ki} - density of it-h carbide, g/ccm;

ρ_c - density of carbon, g/ccm;

ν - number of carbon atoms in carbide molecule.

4. A method according to ~~any one of~~ Claim~~s~~ 1~~-3~~, **characterised** in that the intermediate body is formed with a porosity of 30-70 vol%, preferably 35-50 vol%.

5. A method according to ~~any one of~~ Claim~~s~~ 1~~-4~~, **characterised** in that the intermediate body is formed with a porosity determined with the following relationship;

$$\varepsilon_0 = [1 - \nu_{np} / \sum K_i\varphi_i] * 100$$

where ε_0 - porosity of intermediate body, vol%;

φ_i - volumetric part of i-th carbide in particle mixture;

ν_{np} – predetermined volumetric part of nanopores in final article;

$$K_i = 1 - \nu M_c\rho_{ki} / M_{ki}\rho_c$$

where M_c - molecular mass of carbon, g/mole;

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M_{ki} - molecular mass of it-h carbide, g/mole;

ρ_{ki} - density of it-h carbide, g/ccm;

ρ_c - density of carbon, g/ccm;

ν - number of carbon atoms in carbide molecule.

6. A method according to ~~any one of~~ Claims 1-5, **characterised** in that the treatment in a medium of gaseous hydrocarbon or hydrocarbon is carried out until the mass of the intermediate body has changed according to the following relationship;

$$\Delta m = Q(\varepsilon_0 - v_{tr}) / (1 - \varepsilon_0)$$

where Δm - relative change of intermediate body mass, g/g;

ε_0 - porosity of intermediate body, vol%;

v_{tr} - predetermined volumetric content of transport pores, vol%;

$$Q = \rho_c / \rho_{mix}$$

Where ρ_c = density of carbon, g/ccm;

ρ_{mix} = density of carbides mixture, g/ccm;

7. A method according to ~~any one of~~ Claims 1-6, **characterised** in that the intermediate body is formed by pressing.

8. A method according to ~~any one of~~ Claims 1-6, **characterised** in that the intermediate body is formed by slip casting, tape casting or slurry casting.

9. A method according to ~~any one of~~ Claims 1-8, **characterised** in that natural gas is used as a mixture of hydrocarbons.

10. A method according to Claim 9, **characterised** in that the treating in hydrocarbon medium is carried out at 750-950°C.

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11. A method according to ~~any one of~~ Claim~~s~~ 1~~-8~~, **characterised** in that at least one of the hydrocarbons used during the treatment of the intermediate body in hydrocarbons medium is selected from the group of acetylene, methane, ethane, propane, pentane, hexane, benzene and their derivatives.

12. A method according to Claim 11, **characterised** in that the treating in hydrocarbon medium is carried out at 550-1200°C.

13. A method according to ~~any one of~~ Claim~~s~~ 1~~-12~~, **characterised** in that the particles of carbide or carbides of which the intermediate body is formed are arranged uniformly throughout its volume.

14. A method according to ~~any one of~~ Claim~~s~~ 1~~-12~~, **characterised** in that the particles of carbide or carbides of which the intermediate body is formed are arranged non-uniformly throughout its volume.

15. A method according to ~~any one of~~ Claim~~s~~ 1~~-14~~, **characterised** in that the thermochemical treatment of the workpiece is carried out in a medium of gaseous halogens, such as chlorine.

16. A method according to ~~any one of~~ Claim~~s~~ 1~~-15~~, characterised in that the thermochemical treatment of the workpiece is carried out at 350-1200°C.

17. A method according to claim ~~15 or 16~~, **characterised** in that chlorine is preferably used for the thermochemical treatment at 500-1100°C.

18. A porous carbon article having nanopores, i.e pores having a size less than 10 nm, and transport pores, i.e. pores having a size grater than 100 nm, **characterised** in that the article consists of a rigid carbon skeleton in which at least 3 % of its mass consists of carbon without nanopores.

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19. A porous carbon article according to Claim 18, **characterised** in that it has nanopores of at least two sizes.

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20. An article according to Claim 18 ~~or 19~~, **characterised** in that the the volume of nanopores is 15-50 % and the volume of transport pores is 10-55 %

21. An article according to Claim~~s~~ 18~~, 19 or 20,~~ **characterised** in that the nanopores are distributed uniformly throughout the volume of the article.

22. An article according to Claim~~s~~ 18~~, 19 or 20~~, **characterised** in that the nanopores are distributed nonuniformly throughout the volume of the article.

23. An article according to ~~any~~ Claim~~s~~ 18~~-22~~, **characterised** in having a specific electrical capacitance of at least 30 F/g when used as electrode material in a double electric layer capacitor.

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24. ~~An article according to Claim 20,~~ characterized in having a specific electrical capacitance of at least 30 F/g when used as electrode mate~~rial in a double electric layer capacitor.~~

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